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U S NAVAL PROVING GROUND  
DAHLGREN, VIRGINIA

REPORT NO 964

**FRAGMENTATION CHARACTERISTICS**

18th Partial Report

FRAGMENTATION TEST OF  
2"75 ROCKET HEADS

FINAL Report

Copy No. 2

Task

Assignment NPG-Re3d-418-1-52

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NPG REPORT NO. 964

U. S. NAVAL PROVING GROUND  
DAHLGREN, VIRGINIA

Eighteenth Partial Report  
on  
Fragmentation Characteristics

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Final Report  
on  
Fragmentation Test of  
2875 Rocket Heads

NAVY RESEARCH SECTION  
SCIENCE DIVISION  
REFERENCE DEPARTMENT

MAY 12 1952

Project No.: NPG-Re3d-418-1-52  
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WPG REPORT NO. 964

Fragmentation Test of 2V75 Rocket Heads  
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PART A

SYNOPSIS

1. This test was conducted to obtain the fragmentation characteristics of the 2V75 Air to Air Folding-Fin Rocket (AAFPR).
2. The HBX-1 loaded 2V75 AAFPR when detonated statically produced:
  - a. relatively fine fragments
  - b. an average median fragment velocity of 3780 ft./sec. and
  - c. an average of 745 fragment hits in total polar angle zone 55°-115°, with the heaviest concentration in zone 95°-100°.

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Fragmentation Test of 2V75 Rocket Heads

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Fragmentation Test of 2V75 Rocket Heads  
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PART B

INTRODUCTION

1. AUTHORITY:

This test was authorized by reference (a) and conducted under Task Assignment NPG-Re3d-418-1-52, reference (b).

2. REFERENCES:

- a. BUORD Conf ltr S78-1(119) Re3d-ANB:hm Ser 25820 of 18 Sep 1951
- b. BUORD Restr ltr NP9 Re3d-ANB:hm of 4 Aug 1951
- c. NOTS Conf NAVORD Report 1263, NOTS 329 of 6 Oct 1950

3. BACKGROUND:

Reference (c) reported on the details of the 2V75 Air to Air Folding-Fin Rocket (AAFFR) which has a high explosive head and is intended to be used by fighter and interceptor aircrafts in attacks against other aircraft. Reference (a) requested the Proving Ground to obtain fragmentation data for this rocket. The results are reported herein.

4. OBJECT OF TEST:

This test was conducted to obtain the fragmentation characteristics of the 2V75 Air to Air Folding-Fin Rocket (AAFFR).

5. PERIOD OF TEST:

- |                                     |                   |
|-------------------------------------|-------------------|
| a. Date Project Letter              | 18 September 1951 |
| b. Date Necessary Material Received | 19 November 1951  |
| c. Date Commenced Test              | 11 December 1951  |
| d. Date Test Completed              | 4 January 1951    |

6. REPRESENTATIVE PRESENT:

This test was witnessed in part by Mr. F. R. Donoghue representing the Bureau of Ordnance.

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Fragmentation Test of 2875 Rocket Heads  
-----PART CDETAILS OF TEST

## 7. DESCRIPTION OF ITEM UNDER TEST:

2875 AAFRR Rockets having HBX-1 loaded MK 2 Rocket Heads and empty Mod 103XE-SF Rocket Motors. The heads were assembled with EX 100 Mod 0 point detonating fuzes which were modified by the Proving Ground for static detonation. The loaded heads with the fuze weighed  $6.30 \pm .05$  lbs. and the empty motors weighed  $4.0 \pm .05$  lbs. totaling  $10.3 \pm .1$  lbs. for the rounds assembled for static detonations. The filler (HBX-1) for the heads weighed 1.4 lbs.

## 8. PROCEDURE:

The twenty (20) rockets were detonated for the following information:

- 5 rounds for fragment mass distribution data,
- 5 rounds for fragment velocity data, and
- 10 rounds for fragment space distribution data.

a. The determination of fragment mass distribution was conducted in a sawdust-filled chamber. Each rocket was supported on its side in a cane fiberboard box. After each detonation, the sawdust was sifted and the fragments collected with the head fragments and the motor fragments separated and classified separately.

b. Fragment velocity measurements were obtained by the usual high speed photographic technique, using a 35mm Fastax camera. Fragment velocities obtained are the mean velocities over the first 30.6 feet of travel of beam spray (polar angle  $75^\circ$  to  $105^\circ$ ) fragments.

c. Fragment space distribution measurements were made in an arena consisting of a complete circle twenty (20) feet in radius. The arena panels were  $1/8"$  mild steel plate, five (5) feet high and marked in  $5^\circ$  zones about the axis of the rocket with the nose pointed toward  $0^\circ$ . The center of gravity of the rocket head coincided with the arena center. Complete fragment penetrations of the panels were counted.

Fragmentation Test of 2V75 Rocket Heads

9. RESULTS AND DISCUSSION:

a. Mass Distribution

Photographs of the fragment mass distribution data are shown in Figures 3 to 7 inclusive and are tabulated in Table III. The data are summarized as follows:

5 ROUND AVERAGES						
Rocket	NO. FRAGMENTS IN VARIOUS WEIGHT GROUPS					
	5/8-2 1/2	2 1/2-5	5-10	10-20	20-30	320-640
	grams	grams	grams	grams	grams	grams
Head	773	125	44	4	0	0
Motor	46	14	15	10	10	1*

\* The largest motor fragment averaged 503 grams.

The fine fragmentation of the rocket head can be attributed to the large explosive charge weight (1.4 lbs.) for a 2V75 diameter head.

b. Fragment Velocity

Detailed fragment velocity data are listed in Table II. The average median beam spray velocity of four rounds was 3780 ft./sec. The fifth round was oriented before detonation in such a way to obtain the velocity of the largest motor fragment by camera. This fragment could not be distinguished on the film but from the location of this fragment on the rounds fired in the field, its velocity is estimated to be in the order of 200 ft./sec.

c. Space Distribution

Detailed space distribution data are listed in Table I and the average fragment hits are summarized as follows:

* 9 ROUND AVERAGES		
Polar Zone	Hits on Panels	Hits on Sphere
0°-55°	0	0
55°-115°	30	745
115°-155°	0	0.
155°-180°	3	8
Total	33	753

\* Ten (10) rounds were detonated, one of which detonated low order. The other nine (9) rounds detonated high order.

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Fragmentation Test of 2V75 Rocket Heads

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As noted from the above data, practically all hits were in zone 55°-115° with the heaviest concentration in zone 95°-100°. Many of the motor fragments struck the 1/8" mild steel panels causing silvery splashes on the steel without even denting the panels.

PART D

CONCLUSIONS

10. The HBX-1 loaded 2V75 AAFRR when detonated statically produced:
- a. relatively fine fragments
  - b. an average median fragment velocity of 3780 ft./sec. and
  - c. an average of 745 fragment hits in total polar zone 55°-115° with the heaviest concentration in zone 95°-100°.

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Fragmentation Test of 2U75 Rocket Heads  
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The tests upon which this report is based were conducted by:

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Fragmentation Division,  
Terminal Ballistics Department

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Fragmentation Test of 2V75 Rocket Heads

TABLE I

SPACE DISTRIBUTION DATA

20' Radius Space Arena 12 December 1951, 2V75 Rockets (Rd. 1)  
 1/8" MS panels 5" high 2 January 1952, 2V75 Rockets (Rds. 2-9)  
 9 Rounds Fired

Zone, Degrees	Rd. 1			Rd. 2			Rd. 3		
	R <sub>e</sub>	L <sub>e</sub>	Avg.	R <sub>e</sub>	L <sub>e</sub>	Avg.	R <sub>e</sub>	L <sub>e</sub>	Avg.
0-5									
5-10									
10-15									
15-20									
20-25									
25-30									
30-35									
35-40									
40-45									
45-50									
50-55									
55-60		1	0.5						
60-65							1		0.5
65-70							1		0.5
70-75	1		0.5				1	1	1
75-80	2	5	3.5	1	2	1.5	1	2	1.5
80-85	4	1	2.5	4	3	3.5	2	1	1.5
85-90	5	3	4	2	3	2.5	1	2	1.5
90-95	6	8	7	7	4	5.5	1	3	2
95-100	10	6	8	12	9	10.5	6	5	5.5
100-105	3	3	3	3	2	2.5	3	1	2
105-110	1		0.5						
110-115									
115-120									
120-125									
125-130									
130-135									
135-140									
140-145									
145-150									
150-155									
155-160									
160-165					1	0.5			
165-170	2	1	1.5	1		0.5			
170-175	1		0.5	2	1	1.5	1		0.5
175-180	1		0.5	2		1	1		0.5

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## Fragmentation Test of 2V75 Rocket Heads

TABLE I (Continued)

20' Radius Space Arena      12 December 1951, 2V75 Rockets (Rd. 1)  
 1/8" MS panels 5" high      2 January 1952, 2V75 Rockets (Rds. 2-9)  
 9 Rounds Fired

Zone, Degrees	Rd. 4			Rd. 5			Rd. 6		
	<u>R.</u>	<u>L.</u>	<u>Avg.</u>	<u>R.</u>	<u>L.</u>	<u>Avg.</u>	<u>R.</u>	<u>L.</u>	<u>Avg.</u>
0-5									
5-10									
10-15									
15-20									
20-25									
25-30									
30-35									
35-40									
40-45									
45-50									
50-55									
55-60	1		0.5						
60-65		1	0.5				1		0.5
65-70									
70-75	1		0.5	1		0.5			
75-80	3	2	2.5		1	0.5	2	2	2
80-85	1	1	1	6	3	4.5	3	1	2
85-90	8	6	7	3	7	5	8	1	4.5
90-95	10	3	6.5	7	3	5	7	7	7
95-100	13	10	11.5	10	10	10	9	6	7.5
100-105	1	2	1.5	6	5	5.5	5	4	4.5
105-110					1	0.5			
110-115		1	0.5						
115-120									
120-125									
125-130									
130-135									
135-140									
140-145									
145-150									
150-155									
155-160									
160-165					1	0.5			
165-170					1	0.5			
170-175					2	1			
175-180		2	1				1		0.5

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Fragmentation Test of 2875 Rocket Heads

TABLE I (Continued)

20' Radius Space Arena 12 December 1951, 2875 Rockets (Rd. 1)  
 1/8" MS panels 5" high 2 January 1952, 2875 Rockets (Rds. 2-9)  
 9 Rounds Fired

Zone, Degrees	Rd. 7			Rd. 8			Rd. 9		
	R <sub>a</sub>	L <sub>a</sub>	Avg.	R <sub>a</sub>	L <sub>a</sub>	Avg.	R <sub>a</sub>	L <sub>a</sub>	Avg.
0-5									
5-10									
10-15									
15-20									
20-25									
25-30									
30-35									
35-40									
40-45									
45-50									
50-55									
55-60		1	0.5				1	1	1
60-65	1		0.5					1	0.5
65-70				2		1			
70-75	1	1	1	1	2	1.5	1	1	1
75-80	2	1	1.5	2	2	2	5		2.5
80-85	4	2	3	5	3	4	5	2	3.5
85-90	2	4	3	9	9	9	4	2	3
90-95	7	9	8	10	5	7.5	11	6	8.5
95-100	10	11	10.5	11	9	10	12	12	12
100-105	8		4	4	1	2.5	5	3	4
105-110									
110-115		1	0.5						
115-120									
120-125									
125-130									
130-135									
135-140									
140-145									
145-150									
150-155									
155-160								1	0.5
160-165					1	0.5			
165-170				1	2	1.5			
170-175		1	0.5	4	3	3.5			
175-180	1		0.5	1		1.5		1	0.5

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Fragmentation Test of 2V75 Rocket Heads

TABLE I (Continued)

20' Radius Space Arena 12 December 1951, 2V75 Rockets (Rd. 1)  
1/8" MS panels 5" high 2 January 1952, 2V75 Rockets (Rds. 2-9)

9 ROUND AVERAGES

Zone, Degrees	Average Impacts Per 5° Zone on Panels	Average Impacts Per Total 5° Zone	Average Impacts Per Unit Solid Angle
0-5			
5-10			
10-15			
15-20			
20-25			
25-30			
30-35			
35-40			
40-45			
45-50			
50-55			
55-60	0.2	4	9
60-65	0.3	7	14
65-70	0.2	5	9
70-75	0.7	17	30
75-80	1.9	47	88
80-85	2.8	70	130
85-90	4.4	111	200
90-95	6.3	159	290
95-100	9.5	240	440
100-105	3.3	81	152
105-110	0.1	2	5
110-115	0.1	2	5
115-120			
120-125			
125-130			
130-135			
135-140			
140-145			
145-150			
150-155			
155-160	.06	.6	3
160-165	0.2	1.5	9
165-170	0.4	2	17
170-175	0.8	2	29
175-180	0.7	1.4	60

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Fragmentation Test of 2875 Rocket Heads

TABLE II

FRAGMENT VELOCITY DATA

35mm Fastax Camera 3300 frames per sec.  
30.6 foot Radius Arena  
Rd. 1, 2875 AAFF Rocket HBX-1 loaded  
Total Head Weight 6.30 lbs. Filler Weight 1.4 lbs.  
Total Head and empty motor weight 10.30 lbs.

<u>Frame in Which Hit Occurred</u>	<u>No. Fragments</u>	<u>Velocity (f/s)</u>
24	10	4210
25	9	4040
26	9	3880
27	10	3740
28	9	3610
29	5	3480
30	2	3370
31	2	3260
32	1	3160
33	2	3060
37	3	2730
38	2	2660
39	3	2590
40	2	2520
Median		3800
Average		3620

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Fragmentation Test of 2U75 Rocket Heads

TABLE II (Continued)

35mm Fastax Camera

3210 frames per sec.

30.6 foot Radius Arena

Rd. 2, 2U75 AAFP Rocket

HBX-1 loaded

Total Head Weight 6.30 lbs.

Filler Weight 1.4 lbs.

Total Head and empty motor weight. 10.30 lbs.

Frame in Which  
Hit Occurred

No. Fragments

Velocity (f/s)

23	6	4270
24	14	4090
25	10	3930
26	13	3780
27	16	3640
28	6	3510
29	8	3390
30	5	3270
31	3	3170
34	1	2890
35	1	2810
36	1	2730
37	2	2650
38	2	2580
39	2	2520
41	1	2400

Median

3750

Average

3630

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Fragmentation Test of 2V75 Rocket Heads

TABLE II (Continued)

35mm Fastax Camera

3240 frames per sec.

30.6 foot Radius Arena

Rd. 3, 2V75 AAFP Rocket

HBX-1 loaded

Total Head Weight 6.30 lbs.

Filler Weight 1.4 lbs.

Total Head and empty motor weight 10.30 lbs.

Frame in Which  
Hit Occurred

No. Fragments

Velocity (f/s)

23

7

4310

24

6

4130

25

3

3970

26

12

3810

27

11

3670

28

8

3540

29

6

3420

30

4

3300

31

1

3200

32

3

3100

33

1

3000

34

1

2920

36

2

2750

37

1

2680

38

2

2610

39

1

2540

Median

3780

Average

3610

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APPENDIX C

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Fragmentation Test of 2V75 Rocket Heads

TABLE II (Continued)

35mm Pastax Camera 3270 frames per sec.  
30.6 foot Radius Arena  
Rd. 4, 2V75 AAFF Rocket HBX-1 loaded  
Total Head Weight 6.35 lbs. Filler Weight 1.4 lbs.  
Total Head and empty motor weight 10.35 lbs.

<u>Frame in Which Hit Occurred</u>	<u>No. Fragments</u>	<u>Velocity (f/s)</u>
23	1	4350
24	5	4170
25	7	4000
26	11	3850
27	15	3710
28	5	3570
29	5	3450
30	3	3340
31	2	3230
32	1	3130
36	2	2780
37	1	2700
42	2	2380
Median		3800
Average		3650

TABLE III

MASS DISTRIBUTION DATA

FRAGMENTATION OF 2775 LAFF ROCKET: HEAD MK 2 BBI-1 LOADED AND MOTOR FOD 1038E-87 (MOTOR EMPTY)

HEAD			F411-0-0.635 0.625-1.25 1.25-2.5 2.5-5 5-10 10-20 20-40 40-80 80-160 160-320 320-640																								Total		Tot- al		Frag- ments		Photo																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
Comp. or Rd. No.	Wt. lb.	lb.	Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams		Grams			

AVERAGE

HEAD

6.29

AVERAGE

MOTOR

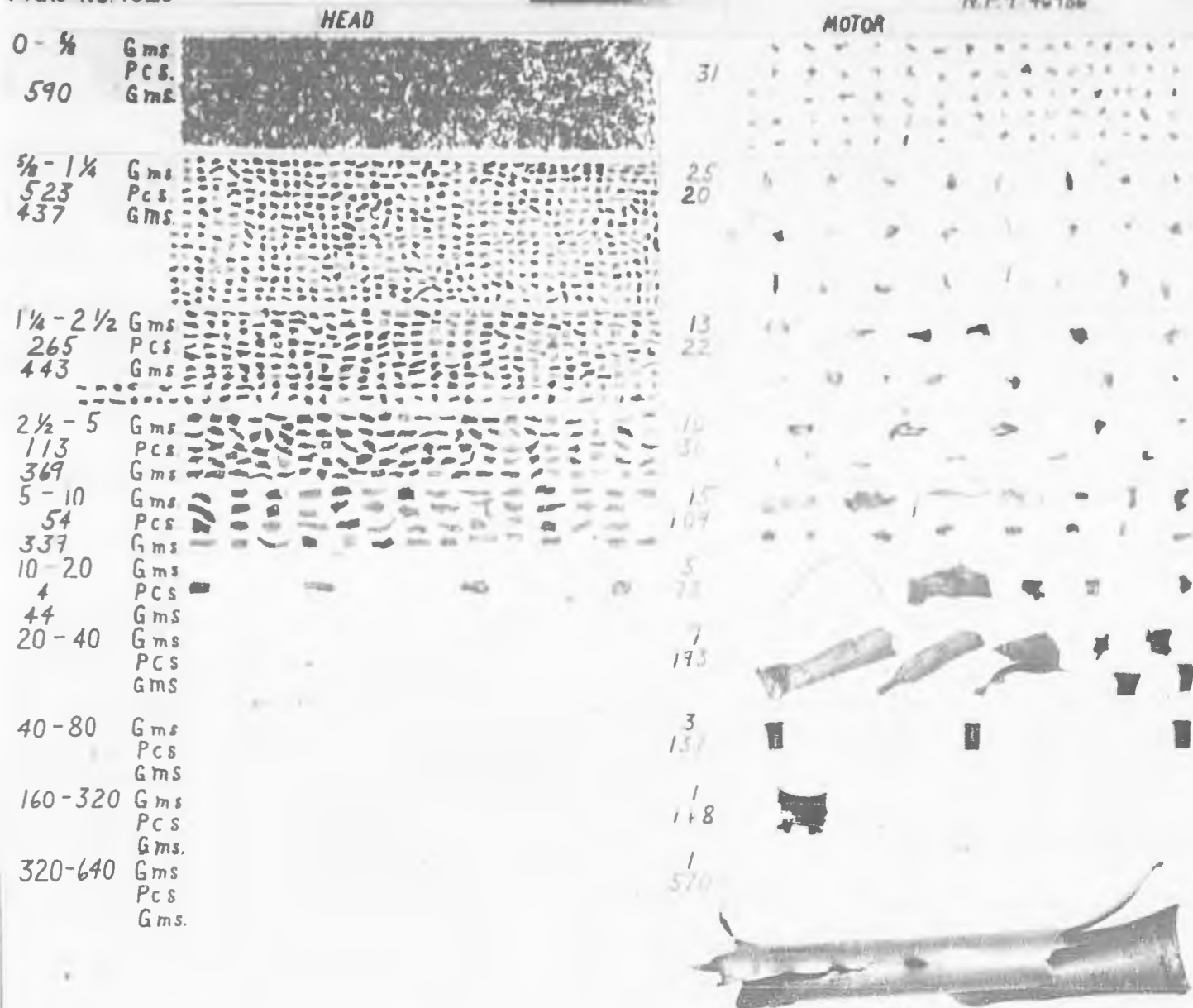
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APPENDIX D

FRAG NO. 1620

NP9 46986



FUZE - FRAGS

45 Pcs  
233 Gms

SCALE 1"

NP9-46986

11 DECEMBER 1951

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Round No. 1. Fragment Mass Distribution of HBX-1 loaded 2.75 AAFP Rocket.  
Figure 3



FRAG NO. 1421

HEAD

NP9-47021

0- 5/8

Gms.  
PCS.  
Gms.

433

MOTOR

20

5/8-1 1/8

Gms.  
PCS.  
Gms.517  
423

41

32

1 1/8-2 1/2

Gms.  
PCS.  
Gms.255  
419

22

37

2 1/2-5

Gms.  
PCS.  
Gms.120  
409

14

51

5-10

Gms.  
PCS.  
Gms.39  
251

17

110

10-20

Gms.  
PCS.  
Gms.8  
95

10

149

20-40

Gms.  
PCS.  
Gms.

4

135

40-80

Gms.  
PCS.  
Gms.

6

294

80-160

Gms.  
PCS.  
Gms.

1

83

320-640

Gms.  
PCS.  
Gms.

1

421

FUZE - FRAGS

PCS.  
Gms.68  
256

SCALE 1"

NP9-47021

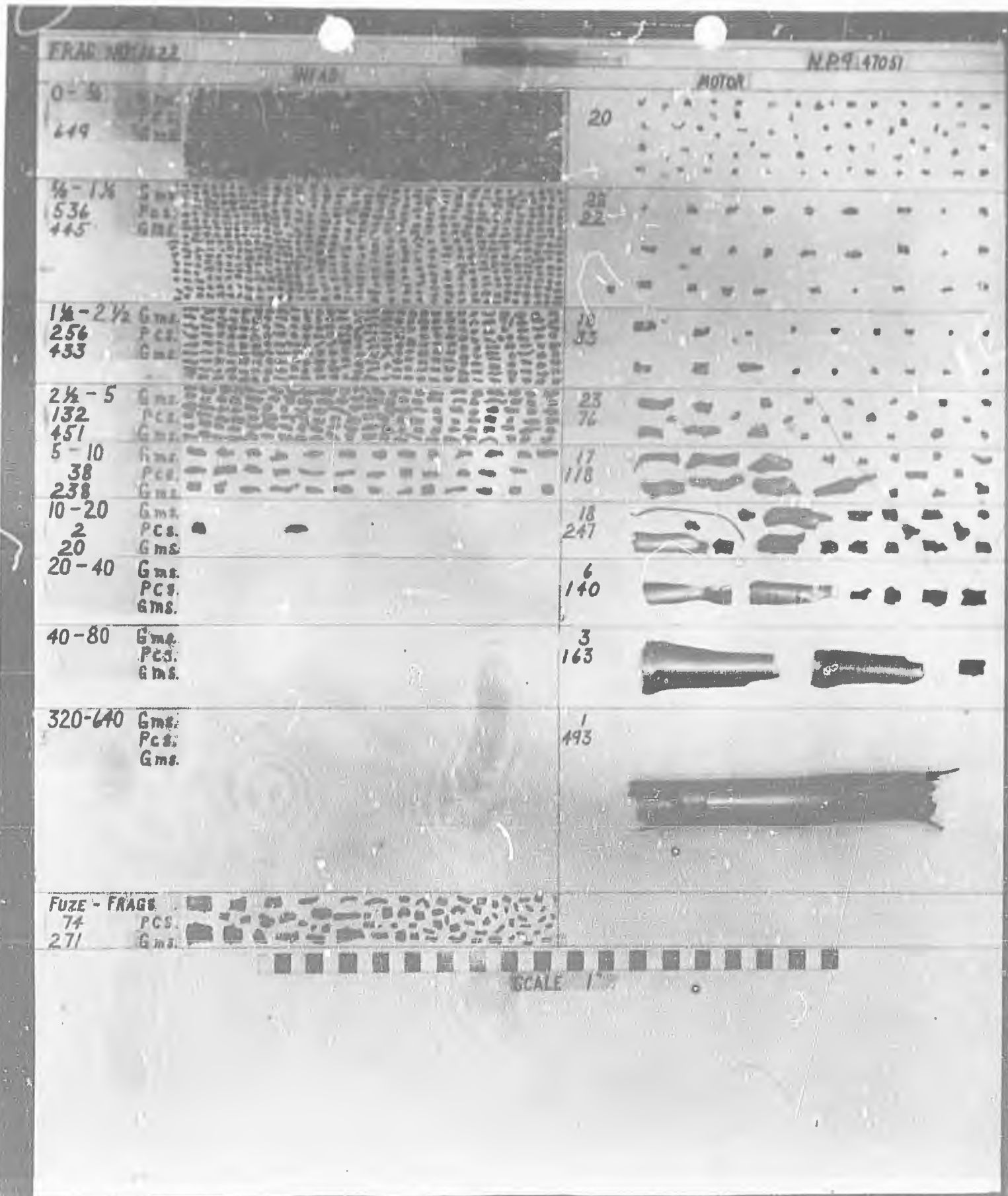
14 DECEMBER 1951

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Round No. 2. Fragment Mass Distribution of HBX-1 loaded 2875 AAFR Rocket.

Figure 4





NP9-47051

20 DECEMBER 1951

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Round No. 3. Fragment Mass Distribution of HBX-1 loaded 2175 AAFP Rocket.  
Figure 5

FRAG NO. 1423

HEAD

NP9-47155

0- 5/8

Gms.  
Pcs.  
Gms.

656

27

5/8- 1 1/4

Gms.  
Pcs.  
Gms.515  
43826  
21

1 1/4- 2 1/2

Gms.  
Pcs.  
Gms.298  
49415  
27

2 1/2- 5

Gms.  
Pcs.  
Gms.128  
42111  
38

5- 10

Gms.  
Pcs.  
Gms.33  
19010  
59

10-20

Gms.  
Pcs.  
Gms.

1

5

20-40

Gms.  
Pcs.  
Gms.

11

61

40-80

Gms.  
Pcs.  
Gms.

1

5  
146

320-640

Gms.  
Pcs.  
Gms.

1

537

FUZE - FRAGS

97

Pcs.  
Gms.

273

SCALE 1"

NP9-47155

28 DECEMBER 1951

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Round No. 4. Fragment Mass Distribution of HBX-1 loaded 2775 AAFV Rocket.

Figure 6

MRP 47156

MOTOR

1 1/2 - 2 1/2 Gms.  
252 Pcs.  
429 Gms.

2 1/2 - 5 Gms.  
133 Pcs.  
449 Gms.

5 - 10 Gms.  
55 Pcs.  
342 Gms.

10 - 20 Gms.  
4 Pcs.  
46 Gms.

20 - 40 Gms.  
Pcs.  
Gms.

40 - 80 Gms.  
Pcs.  
Gms.

320 - 640 Gms.  
Pcs.  
Gms.

34

21  
17

23  
40

14  
51

16  
104

11  
162

4  
134

6  
326

1  
494

FOZE - Finns  
84 Pcs.  
272 Gms.

SCALE 1"

Round No. 5. Fragment Mass Distribution of HX-1 loaded 2275 AAPP Rocket.  
Figure 7

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NPG REPORT NO. 964

Fragmentation Test of 2V75 Rocket Heads

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RPG REPORT NO. 964

Fragmentation Test of 2075 Rocket Motors

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